

Application No. 10/014,535
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REMARKS/ARGUMENTS

Claim 9 has been cancelled. Claims 11-17 have been added. Claims 1-8 and 10 have been amended. Claims 1-8 and 10-17 are pending in the application.

In the office action dated November 1, 2005, the Examiner rejected claims 1-10 under 35 USC 102(e) as being anticipated by U.S. Patent No. 6,226,491 to Wachs et al. The Examiner further rejected claims 1-10 under 35 USC 102(b) as being anticipated by U.S. Patent No. 5,982,809 to Liu et al.

Wachs teaches modulating a data signal onto a pseudo-randomly generated carrier signal using standard frequency modulation techniques. In column 2 at line 61, Wach teaches "More specifically, the pseudo-random waveform modulates the local oscillator 18 about a nominal frequency, which is then used to drive mixer 16." Applicant respectfully submits that modulating a local oscillator about a nominal frequency to create a carrier signal onto which a data signal is modulated for transmission, results in a continuously varying carrier signal that has a random component. This results in a carrier signal that appears as noise, so that when the data signal is modulated onto it, an observer without access to the same random component will not be able to easily demodulate the signal. However, the introduction of a random component into a local oscillator results in a signal that is continuous. Time based synchronization becomes crucial, as if the transmitter and receiver are out of sync, the decoding process is not possible. The use of a pseudo-random number generator at both transmitter and receiver using the same seed value can only be implemented if the transmission delay time between the sending and receiver is carefully taken into account.

Liu teaches the removal of a pseudo-noise component from a received signal. The teachings of the Liu reference relate to the determination of a carrier offset in a receiver and are not directed towards the effective encryption of a transmitted data signal.

When a signal is intercepted in transmission, it can usually be analyzed to determine a carrier signal that has been selected *a priori* so that the receiver can receive the signal and remove the carrier signal to obtain the data signal. Such a process usually requires that a sufficiently large portion of the signal be intercepted so that the carrier signal can be determined.

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Although conventional modulation makes use of standard signals such as sinusoids, any signal can be used, so long as both the sender and receiver have agreed upon the signal. In the system of Wachs, the signal is agreed upon in advance by synchronizing pseudo-random generators at the sender and receiver, and then using the pseudo-random generators to vary the output of a local oscillator. By not using a simple carrier signal, Wachs teaches an effective method of obscuring the message by making it difficult to determine the carrier signal. Removal of the modulation signal will result in recovery of the transmitted signal (possibly modified by noise in the transmission medium). Applicant respectfully submits that the claims of the instant application are directed to the use of a carrier signal neither taught nor taught towards by the cited references, and as such submits that the claims are not anticipated by the cited references.

Applicant has amended claim 1 so that it recites "a transmitting device for modulating a data signal onto a piecewise continuous carrier signal and for transmitting the modulated signal onto a transmission medium". Applicant submits that neither Wachs nor Liu teach or teach towards the use of a piecewise continuous carrier signal for modulating the data signal. Liu does not direct its teachings to the selection of any carrier signal as it is focused on receivers, while Wachs makes use of a wholly continuous signal that has a random component to it. Such a signal is not considered to be piecewise continuous. Instead, the system of claim 1 makes use of a plurality of different signals during defined time windows to create a piecewise continuous carrier signal.

Applicant submits that this amendment is fully supported by the specification as filed, and directs the Examiner's attention to page 5 line 17 of the specification as filed which states "the values of these attributes are defined for the period required to transmit a 'group of bits'. They are then modified for each succeeding 'group of bits'." Applicant further directs the Examiner's attention to page 6 line 17 which states "...the technique includes changing the parameters of the 'noise' signal at frequent intervals, viz., after every 'group of bits'...". Applicant notes that the carrier signal is described as being generated on the basis of several parameters, which are then modified at defined time intervals. One skilled in the art will appreciate that unlike Wachs, which constantly modifies the carrier signal, the modification of the carrier signal for windows defined by 'groups of bits' results in the creation of a piecewise continuous carrier signal.

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Not only does Wachs not teach a piecewise continuous carrier signal, it teaches away from it, but having the pseudo-randomly generated noise modulated onto the output of the local oscillator, which will result in a completely continuous function with a randomly varying component. As noted earlier, this requires complex synchronization of the pseudo-random noise generators in the transmitter and receiver, while the use of a 'group of bits' based window allows for a much simpler synchronization.

Accordingly, in view of the amendments to claim 1, and the argument presented above, it is submitted that claim 1 is patentable in view of both Liu and Wachs, and Applicant respectfully requests that the rejection of claim 1 under 35 USC 102(e) and 102(b) be withdrawn.

Applicant has amended claims 2, 3, 4, 5, 6, 7 and 8. Applicant submits that the amendments to these claims are supported by the specification as filed, and directs the Examiner's attention to Figure 5 which clearly illustrates components providing the claimed functionality. Applicant further directs the Examiner's attention to page 6 of the specification, which at line 20 discloses that "... the number of bits in the 'group of bits' is itself a variable...", to support the claiming of the variant size of the 'group of bits'. Amendments to claims 1-8 have been made to address antecedent errors and to introduce consistent terminology in the claims.

Applicant has cancelled claim 9.

Applicant submits that claims 2-8 all depend upon claim 1, which is submitted as being patentable in view of both the Wachs and Liu references. Applicant submits that as claims 2-8 all include the limitations of claim 1, they are also patentable in view of the Wachs and Liu references. Applicant further notes that the use of an output of the random number generator to determine the length of each of the piecewise continuous segments of the carrier signal, as claimed in claims 7 and 8, further distinguishes the claimed invention from the prior art. As noted in the specification as filed, frequent changes between the continuous pieces of the piecewise continuous carrier signal make it difficult for a third party to determine what the carrier signal is, which increases the difficulty in unauthorized decoding, however an authorized receiver which knows *a priori* where changes will occur and how the changes will modify the parameters of the carrier signal are able to decode the received signal without

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difficulty. By specifying the length of the piecewise segments as 'groups of bits' instead of as time segments, the claimed invention is further distinguished from the prior art which uses a time varying pseudo-random noise signal to modify a local oscillator output. The point at which there is a change the parameters of the carrier signal can be determined by use of a counter instead of using synchronized timers, this allows for a simplified implementation. In view of these comments and amendments, Applicant respectfully submits that the matter of claims 2-8 is patentable in view of the cited references, and requests that the rejections under 35 USC 102(b) and 102(e) be withdrawn.

Applicant has amended claim 10 to recite the steps of generating a piecewise continuous carrier signal, modulating the data signal with the generated carrier signal, and transmitting the modulated signal. Applicant submits that these steps correspond to the operation of the system of claim 1, and are described in the specification as filed. Applicant re-iterates the comments made with reference to claim 1 regarding the use of a piecewise continuous carrier signal, and submits that neither Wachs nor Liu teach such a method. Accordingly, Applicant submits that neither Wachs nor Liu anticipate the matter of claim 10, and Applicant respectfully requests that the rejections under 35 USC 102(b) and 102(e) be withdrawn.

Applicant has added new claims 11-17 whose subject matter corresponds to the dependent claims of claim 1, but in method form. Applicant submits that the application as filed fully supports these claims and that none of these claims are directed to matter not fully supported by the application as filed. Applicant notes that claims 11-17 depend, either directly or indirectly from claim 10, and as such include all the limitations of claim 10. As claim 10 is submitted to be patentable in view of the Wachs and Liu references, Applicant submits that each of claims 11-17 are also patentable in view of these references.

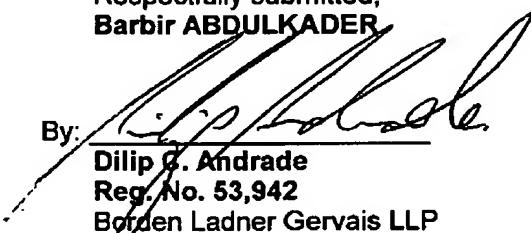
Applicant submits that no new matter has been added by way of the amendments to the claims, and that each of the amended claims is fully supported by the specification as filed. In view of the amendments to the claims, and the arguments presented above, Applicant requests that the rejections made under 35 USC 102(b) and 102(e) be withdrawn, and that the application proceed to allowance.

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No fee is believed due for this submission. However, Applicant authorizes the Commissioner to debit any required fee from Deposit Account No. 501593. The Commissioner is further authorized to debit any additional amount required, and to credit any overpayment to the above-noted deposit account.

Respectfully submitted,
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